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10/695,367	10/28/2003	Oswin Ottinger	SGL 02/24	5955
24131 7590 08/22/2007 LERNER GREENBERG STEMER LLP P O BOX 2480 HOLLYWOOD, FL 33022-2480			EXAMINER VIJAYAKUMAR, KALLAMBELLA M	
			ART UNIT 1751	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/695,367	<b>Applicant(s)</b> OTTINGER ET AL.	
	<b>Examiner</b> Kallambella Vijayakumar	<b>Art Unit</b> 1751	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 06/07/2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

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### DETAILED ACTION

- Claims 1 and 8 were amended. Claim –2 cancelled. Claims 1 and 3-13 as amended are currently pending with the application.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1, 7-9 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Doi et al (JP 63-023993).

Doi et al teaches moldable composite composition and a molded product comprising 0.5-90 wt% expanded graphite powder with a bulk density of 0.01-0.5 cc/g that has been surface treated with lubricating oil <PCM>, and 99.5 to 10 wt% thermoplastic such as PPS and nylon-6 <PCM> (Abstract). The prior art teaches surface treating the expanded graphite powder by immersion with lubricating oil <paraffin/PCM>, crushing it and mixing it homogeneously with a thermoplastic binder, and then forming the molded product. The prior art component ratios when calculated as volume % percent using the bulk density values will overlap over instant claimed ranges. All the limitations of the instant claims are met.

The reference is anticipatory.

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2. Claims 1, 5-8 and 10-11 are rejected under 35 U.S.C. 102(b) as being unpatentable over Xiao et al (Energy Conversion and Management, January 2002, (43), Pages 103-108) in view of Eska et al (DE 19630073 A1).

Normally, only one reference should be used in making a rejection under 35 U.S.C. 102. However, a 35 U.S.C. 102 rejection over multiple references has been held to be proper when the extra references are cited to <MPEP 2131.01>:

- (A) Prove the primary reference contains an "enabled disclosure; "
- (B) Explain the meaning of a term used in the primary reference; or
- (C) Show that a characteristic not disclosed in the reference is inherent.

The prior art teaches a shape stabilized latent heat storage device comprising SBS rubber ( $d=0.98$  g/cc), paraffin ( $d=0.84-0.9$  g/cc) and expanded graphite (EG) in the ratio of 80:20:5 parts by weight respectively (Page-103, Abstract; Page 104, Sec. 2.1 and 2.3; Pg-105, Section 2.5; Page-106, Sec 3.2). The particle size of the graphite was 300 microns. The bulk density of expanded graphite used in a latent heat device is 75-300 g/l (See Eska et al, Abstract) and the prior art component ratios when calculated as volume % percent using the density values will overlap over instant claimed ranges that meets the limitations of claims 1 and 5-6.

Paraffin meets the limitation of specific PCM in claim-7.

With regard to claims 8 and 10-11, the prior art teaches making a cylindrical device by mixing EG with molten paraffin/PCM and molding the composition in to cylinder (Page-104, Sec. 2.3, Page-105, Sec 2.5). All the limitations of the instant claims are met.

The reference is anticipatory.

3. Claims 1, 5-8 and 10-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Bader (Thesis, Univ. Auckland, February 2002) in view of Eska et al (DE 19630073 A1).

The prior art teaches a thermal energy storage composition comprising LDPE, EVA, paraffin wax and 5 wt% expanded/exfoliated graphite powder [EG] (Pg-11; Table 3.1-1; Pg-18, Table 3.2-1). The exfoliated graphite had a particle size of less than 12 micron for UF2 96/97 and less than 45 micron for EDM 96/97. The bulk density of expanded graphite used in a latent heat device is 75-300 g/l (See Eska et

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al, Abstract) and the prior art component ratios when calculated as volume % percent using the density values will overlap over instant claimed ranges that meets the limitations of claims 1 and 5-6.

Paraffin meets the limitation of specific PCM in claim-7.

With regard to claims 8 and 10-12, the prior art teaches making a PCM by mixing the components, melt blending the components and forming a pellets (Page-15) and shaping the product by melt injection (Page-16).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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1. Claims 5-6 are rejected under 35 U.S.C. 103(a) as obvious over Doi et al (JP 63-023993).

The disclosure on the composition and making of the composite by Doi et al as set forth in rejection-1 under 35 USC 102(b) is herein incorporated.

The prior art is silent about the particle size per the claim-5.

The prior art teaches crushing the EG product and blending with the resin, and generally, differences in concentration or temperature or particle size will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature or particle size is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

2. Claims 12-13 are rejected under 35 U.S.C. 103(a) as obvious over Doi et al (JP 63-023993) in view of either Hayward, (US 5,882,570) or Chavatal et al. (US 3,361,684).

The disclosure on the composition and making of the composite by Doi et al as set forth in rejection-1 under 35 USC 102(b) is herein incorporated.

The prior art is silent about making the composite by specific molding per claims 12-13.

However, the prior art teaches molding the product into a shape and it would have been obvious to use common molding techniques such as injection molding which was commonly used for molding graphite products at the time of the disclosure of the invention by the applicants (Hayward, US 5,882,570, Abstract) or jolting molding used for resin composites (Chavatal et al, US 3,361,684; Title, Cl-5, Ln 35-40) as functional equivalent of molding process with reasonable expectation of success.

3. Claims 1 and 5-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xiao et al (Energy Conversion and Management, January 2002, (43), Pages 103-108) in view of Eska et al (DE 19630073 A1).

The prior art teaches a shape stabilized latent heat storage device comprising SBS rubber (d=0.98 g/cc), paraffin (d=0.84-0.9 g/cc) and expanded graphite (EG) in the ratio of 80:20:5 parts by weight

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respectively (Page-103, Abstract; Page 104, Sec. 2.1 and 2.3; Pg-105, Section 2.5; Page-106, Sec 3.2).

The particle size of the expandable graphite was 300 microns.

The prior art is silent about the volume % of the components per the claim-1 and density of EG per claims 5-6, and mixing particles per claim-9.

The prior art teaches using a commercially available expanded graphite with a particle size of 300 micron after exfoliation in the composition. The bulk density of expanded graphite used in a latent heat device is 75-1,500 g/l (Eska et al, DE 19630073 A1, Abstract; Tamme, Workshop on Thermal Storage for Trough Power Systems, Feb. 20-21, 2003, Golden CO, Page-17) and the prior art component ratios when calculated as volume % percent using the density values would overlap over instant claimed ranges in claims 1 and 5-6.

With regard to claim-7, the prior art teaches paraffin.

With regard to claims 8 and 10-11, the prior art teaches making a cylindrical device by mixing EG with molten paraffin/PCM and molding the composition in to cylinder (Page-104, Sec. 2.3, Page-105, Sec 2.5).

With regard to claim-9, the prior art teaches blending of the components, and an elimination of a pre-blending the particles as a choice of design of the process conditions by a person of ordinary skilled in the art would be obvious, because Omission of an Element/Step and Its Function Is Obvious If the Function of the Element/Step Is Not Desired Ex parte Wu , 10 USPQ 2031 (Bd. Pat. App. & Inter. 1989) <MPEP 2144.04>.

4. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xiao et al (Energy Conversion and Management, January 2002, (43), Pages 103-108) in view of in view of Eska et al (DE 19630073 A1) and Neuschutz et al (US 2002/0033247).

The disclosure by Xiao et al on the composition and making of the a latent heat storage device as set forth in rejection-3 under 35 USC 103(a) is herein incorporated.

The prior art fails to teach the addition of a nucleating agent per claims-3-4.

In the analogous art, Neuschutz et al teach the addition of axillaries such as nucleating agents to the compositions containing liquid-solid PCM's containing graphite (Para 0035; 0040-0041).

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It would be obvious to a person of ordinary skill in the art to combine the prior art teachings to include nucleating agents in the latent heat storage device of Xiao to minimize super cooling effects with reasonable expectation of success because it is a solid-liquid type PCM device and teachings are in analogous art. With regard to claim-4, it requires an addition of a miniscule amount of a nucleating agent to the composition, and this would be obvious over the addition a nucleating agent to the composition of Xiao et al and Similarly, a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (Court held as proper a rejection of a claim directed to an alloy of "having 0.8% nickel, 0.3% molybdenum, up to 0.1% iron, balance titanium" as obvious over a reference disclosing alloys of 0.75% nickel, 0.25% molybdenum, balance titanium and 0.94% nickel, 0.31% molybdenum, balance titanium.).

5. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xiao et al (Energy Conversion and Management, January 2002, (43), Pages 103-108) in view of Eska et al (DE 19630073 A1) and either Hayward, (US 5,882,570) or Chavatal et al. (US 3,361,684).

The disclosure by Xiao et al on the composition and making of the a latent heat storage device as set forth in rejection-3 under 35 USC 103(a) is herein incorporated.

The prior art is silent about making the device by specific molding per claims 12-13.

However, the prior art teaches molding the composite into a shape, and it would have been obvious to a person of ordinary skilled in the art to use common molding techniques including injection molding which was routinely used for molding polymer/graphite composites (Hayward, US 5,882,570, Abstract) or jolting molding used for making filled resin composites (Chavatal et al, US 3,361,684; Title, Cl-5, Ln 35-40) as functional equivalent of molding process with reasonable expectation of success, because these processes were well known in the art for molding polymer composites at the time of the disclosure of the invention by the applicants.



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6. Claims 1 and 5-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bader (Thesis, Univ. Auckland, February 2002) in view of Eska et al (DE 19630073 A1).

The prior art teaches a thermal energy storage composition comprising LDPE, EVA, paraffin wax (d= 0.84-0.92 g/cc) and 5 wt% expanded/exfoliated graphite powder (EG) (Pg-11; Table 3.1-1; Pg-18, Table 3.2-1). The exfoliated graphite had a particle size of less than 12 micron for UF2 96/97 and less than 45 micron for EDM 96/97.

The prior art is silent about the volume % of EG per claim-1, the bulk density of the expanded graphite in claims 5 and 6, and mixing per claim-9.

The prior art teaches using a commercially available expanded graphite with a particle size of 300 micron after exfoliation in the composition. The bulk density of expanded graphite used in a latent heat device is 75-1,500 g/l (Eska et al, DE 19630073 A1, Abstract; Tamme, Workshop on Thermal Storage for Trough Power Systems, Feb. 20-21, 2003, Golden CO, Page-17) and the prior art component ratios when calculated as volume % percent using the density values would overlap over instant claimed ranges in claims 1 and 5-6.

With regard to claim-7, the prior art teaches paraffin.

With regard to claims 8 and 10-11, the prior art teaches making a PCM by mixing the components, melt blending the components and forming a pellets (Page-15) and shaping the product by melt injection (Page-16).

With regard to claim-9, the prior art teaches blending of the components, and an elimination of a pre-blending the particles as a choice of design of the process conditions by a person of ordinary skilled in the art would be obvious, because Omission of an Element/Step and Its Function Is Obvious If the Function of the Element/Step Is Not Desired Ex parte Wu , 10 USPQ 2031 (Bd. Pat. App. & Inter. 1989) <MPEP 2144.04>.

7. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bader (Thesis, Univ. Auckland, February 2002) in view of Eska et al (DE 19630073 A1) and Neuschutz et al (US 2002/ 0033247).

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The disclosure by Bader et al on the composition and making of the a latent heat storage/PCM device as set forth in rejection-6 under 35 USC 103(a) is herein incorporated.

The prior art fails to teach the addition of a nucleating agent per claims-3-4.

In the analogous art, Neuschutz et al teach the addition of axillaries such as nucleating agents to the compositions containing liquid-solid PCM's containing graphite (Para 0035; 0040-0041).

It would be obvious to a person of ordinary skill in the art to combine the prior art teachings to include nucleating agents in the latent heat storage device of Bader to minimize super cooling effects with reasonable expectation of success because it is a solid-liquid type PCM device and teachings are in analogous art. With regard to claim-4, it requires an addition of a miniscule amount of a nucleating agent to the composition, and this would be obvious over the addition a nucleating agent to the composition of Xiao et al and Similarly, a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (Court held as proper a rejection of a claim directed to an alloy of "having 0.8% nickel, 0.3% molybdenum, up to 0.1% iron, balance titanium" as obvious over a reference disclosing alloys of 0.75% nickel, 0.25% molybdenum, balance titanium and 0.94% nickel, 0.31% molybdenum, balance titanium.).

8. Claim 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bader (Thesis, Univ.

Auckland, February 2002) in view of Eska et al (DE 19630073 A1) and Chavatal et al (US 3,361,684).

The disclosure by Bader et al on the composition and making of the a latent heat storage/PCM device as set forth in rejection-6 under 35 USC 103(a) is herein incorporated.

The prior art fails to teach making the device by jolt-molding per claim 13.

However, the prior art teaches molding the composite into a shape and it would have been obvious to a person of ordinary skilled in the art to substitute the molding technique with other common molding techniques including jolting molding as functional equivalent with reasonable expectation of success because it was well known in the art to at the time of disclosure of the invention by the applicants to use it in making filled resin composites (Chavatal et al, US 3,361,684; Title, CI-5, Ln 35-40).

***Response to Arguments***

Applicant's arguments filed 06/07/2007 have been fully considered but they are not persuasive. The argument that Tamme (Feb 20-21, 2003) is not available as a prior art is not persuasive (Res. Pg-9, Para-2), because the instant application has a filing date of 10/28/2003, and applicant's have not provided the certified English Translation of the priority documents in accordance with 37 CFR 1.55, and hence cannot rely upon the foreign priority papers to overcome this prior art. See MPEP § 201.15. Applicant's argument that the EG ratios in Xio et al and Bader would be lower than the claimed range based on the Xylene density of Timerex data sheet is not persuasive (Res. Pg-10), because the use of xylene density in lieu of bulk/Scott density in the same data sheet is erroneous, and applicant's claim of volume % is based on bulk/tap density (See Example-1 of the Specification). The calculations based on bulk density of EG from either Eska et al or Tamme's or Timerex would overlap over the instant claimed vol% ranges for EG. With regard to the argument that SBS of Xio et al does not contribute to the heat storage nor to its thermal conductivity (Res. Pg-9, Last-Para), such an addition is not precluded by the definition of PCM materials and the instant claim limitation of "comprising". With regard to the argument that Bader et al does not suggest that an increase in the graphite fraction would be beneficial (Res. Pg-11, Para-2), the prior art teachings and ranges overlap over instant claimed ranges. With regard to the benefits applicant's formulation, they are not the limitations of the instant claims, and although "That claims are interpreted in light of the specification does not mean that everything in the specification must be read into the claims." Raytheon Co. v. Roper Corp., 724 F.2d 951, 957, 220 USPQ 592, 597 (Fed. Cir. 1983), cert. denied, 469 U.S. 835 (1984).

For the reasons set forth above, applicant's fail to distinguish their composition over the prior art.

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**Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and cumulative to the above rejections include: Hayward, US 5,882,570; Maeno et al, US 4,971,726; Sakawaki, US 5,330,680; and Balat et al US 4,906,258.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-1324. The examiner can normally be reached on 8.30-6.00 Mon-Thu, 8.30-5.00 Alt Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas McGinty can be reached on 571-272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KMV/  
August 13, 2007.

/Mark Kopec/  
Mark Kopec  
Primary Examiner 1700